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On some closure properties of the non-abelian tensor product

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Abstract

We prove that the class of nilpotent by finite, solvable by finite, polycyclic by finite, nilpotent of nilpotency class n and supersolvable groups are closed under the formation of the non-abelian tensor product. We provide necessary and sufficient conditions for the non-abelian tensor product of finitely generated groups to be finitely generated.

Keywords: Schur multiplier, non-abelian tensor product
2010 MSC: 20D99, 20F16, 20F05, 20F80, 20G05, 20G06

1. Introduction

One of the objectives of this paper is to study some closure and finiteness properties of the non-abelian tensor product $G \otimes H$ of groups. R. Brown and J.-L. Loday introduced the non-abelian tensor product $G \otimes H$ for a pair of groups G and H in [5] and [6] in the context of an application in homotopy theory, extending the ideas of J.H.C. Whitehead in [15]. We were naturally led to the study of the closure properties of non-abelian tensor product of groups while considering the question whether the Schur multiplier of Noetherian groups is finitely generated.

In [7] and [12], the authors prove that the non-abelian tensor product of finite groups is a finite group, and they also show that the non-abelian tensor product of finite p-groups is a finite p-group. In [13], Visscher proved that

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